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(54) IMAGE DISPLAY DEVICE AND ITS CONTROL METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To search a target image through a simple operation from a storage medium for performing images by an image pickup unit, such as a digital camera.
SOLUTION: When 200 images, for example, are stored in a memory card used in the digital camera and a monitor is provided with performance to display a 4 × 4 thumbnail image, the number of skips is calculated by dividing the number of storage images by the number of display possible thumbnail images (step S4) and also the images in the memory card are sorted in order of photographing time (step S5). Then the calculated skip number of images are made to be one group, and the thumbnails of the candidate images of the groups are displayed as a list (step S6). When one of the listed and displayed thumbnails is selected, the thumbnails of the group comprising the thumbnail are displayed as a list (step S11).
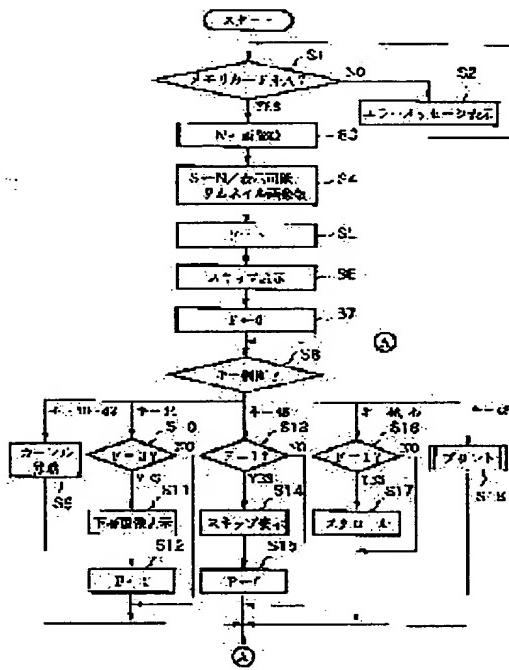
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CLAIMS

[Claim(s)]
[Claim 1] A sort means to be the image display device which displays the image in the storage memorized by image pick-up equipment on the display screen of a predetermined display means, and to arrange the information about each image in said storage in order of an image pick-up. An operation means to calculate the number of skips of a display image by dividing by the number of the contraction image which carries out counting of the number of images in said storage, and displays the number of images concerned which carried out counting on said display screen, The 1st display-control means on which the contraction image which makes a group the image group of the number of skips calculated with said operation means to the sequence of the image put in order with said sort means, and serves as each group's representation is displayed with said display means, this — the image display device characterized by having the 2nd display-control means on which the contraction image corresponding to the image in the group in whom the contraction image concerned is contained is displayed with said display means when one of the contraction images displayed with the 1st display-control means is chosen.
[Claim 2] Said sort means is an image display device given in the 1st term of a claim characterized by using as a key the file name of the image stored in said storage, and sorting it.
[Claim 3] An image display device given in the 1st term of a claim characterized by having further the means which carries out the printout of the image corresponding to the selection contraction image concerned when one of the contraction images displayed on said display means is chosen and predetermined actuation is performed.
[Claim 4] Said 2nd display-control means is an image display device given in the 1st term of a claim which carries out grouping of the image within groups involved recursively, and is characterized by displaying the contraction image corresponding to each group's representation image when the number of the images contained in the group for a display exceeds the number of contraction images which can be displayed on said display screen.
[Claim 5] The sort process which is the control approach of the image display device which displays the image in the storage memorized by image pick-up equipment on the display screen of a predetermined display means, and arranges the information about each image in said storage in order of an image pick-up. The operation process which calculates the number of skips of a display image by dividing by the number of the contraction image which carries out counting of the number of images in said storage, and displays the number of images concerned which carried out counting on said display screen, The 1st display-control process on which the contraction image which makes a group the image group of the number of skips calculated at said operation process to the sequence of the image put in order at said sort process, and serves as each group's representation is displayed with said display means, this — the control approach of the image display device characterized by having the 2nd display-control process on which the contraction image corresponding to the image in the group in whom the contraction image concerned is contained is displayed with said display means when one of the contraction images displayed at the 1st display-control process is chosen.

[Translation done.]

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3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the equipment which displays the image in the storage memorized by image pick-up equipments, such as a digital camera, and its control approach.
[0002]
[Description of the Prior Art] It is most which is equipped with the liquid crystal display unlike the old film-based camera, and since the photoed contents can be checked immediately and rewritable memory cards (flash memory etc.) moreover memorize as data, a digital camera has an immediately eliminable merit, when not pleased. And a phase which is equal to a film-based camera also in image quality is arrived at. And the storage capacity of the memory card to save is also large, and since the price of memory is moreover also digested, it is expected that it will spread increasingly from now on.
[0003] Generally, a photograph is taken with a digital camera, and in order to discover the target image out of the image memorized by the memory card, it displays one coma at a time by operating coma delivery and a coma return carbon button.
[0004] However, in having displayed per 1 coma, by the time it arrives at the target image, many actuation will be needed.
[0005]
[Problem(s) to be Solved by the Invention] There is a technique which displays two or more contraction images (generally called the thumbnail) of the photoed image on the display screen to this problem. Since two or more contraction images of the photoed image can be displayed at once according to this, the activity to which making 1/several thumbnails which can be displayed at the maximum simplify the count of a switch of a screen discovers the target image by becoming possible also becomes easy. However, if the storage capacity of a memory card is becoming larger and the number of images in which inevitability and storage are possible also becomes hundreds of sheets, it will not come to acquire a sufficiently satisfactory operating environment only by the display of a thumbnail image.
[0006] This invention is made in view of this trouble, and it is going to offer the image display device to which it closes discovering the image made into the purpose out of the storage memorized by image pick-up equipments, such as a digital camera, by simple actuation if , and its control approach.
[0007]
[Means for Solving the Problem] In order to solve this technical problem, the image display device of this invention is equipped with the configuration shown below. Namely, a display means to be the image display device which displays the image in the storage memorized by image pick-up equipment, and to display two or more contraction images to the image in said storage on the predetermined display screen, A sort means to arrange the information about each image in said storage in order of an image pick-up, An operation means to calculate the number of skips of a display image by dividing by the number of the contraction image which carries out counting of the number of images in said storage, and displays the number of images concerned which carried out counting on said display screen, The 1st display-control means on which the contraction image which makes a group the image group of the number of skips calculated with said operation means to the sequence of the image put in order with said sort means, and serves as each group's representation is displayed with said display means, When one of the contraction images displayed with this display means is chosen, it has the 2nd display-control means on which the contraction image corresponding to the image in the group in whom the contraction image concerned is contained is displayed with said display means.
[0008]
[Embodiment of the Invention] Hereafter, the operation gestalt which starts this invention according to an accompanying drawing is explained to a detail.
[0009] Drawing 1 shows the condition of having connected the printer in an operation gestalt to the television monitor, and drawing 2 shows the block block diagram of a printer.
[0010] As shown in illustration, in appearance the printing equipment 100 of an operation gestalt the control panel 103 for performing the form cassette wearing opening 102 and various actuation of equipping with the insertion opening 101 which inserts the memory card 300 photoed and memorized with the digital camera (un-illustrating), and the form cassette 400 which contains the recording paper (it considered as A6 size with the operation gestalt) — and Television equipment (television) 200 (only henceforth a monitor) is equipped with the output terminal (tooth back) which sends a video signal.
[0011] Moreover, RAM used like internal electric system as a work area of ROM2 and CPU1 which have memorized the procedure (program) of CPU1 and CPU1 which manage control of the whole equipment of operation as shown in drawing 2 , D/A conversion of the image data developed by the video memory 6 for developing the image data for carrying out a display output to memory card I/F5 for making electric connection with the printer section 4 and the memory card 300 which carry out printing processing, and a monitor 200, and video memory is carried out. For example, it consists of the video outlet sections 7 outputted as a video signal of the NTSC format.
[0012] The printer section 4 in an operation gestalt shall perform record by the recording head to the midst which adopt a idye sublimation printer, and an one-sheet unit is made to once convey the recording paper in equipment, and is conveyed to hard flow after an appropriate time. Moreover, the recording paper [finishing / record] constituted structure which does not bar return into the equipment of the following recording paper, and is discharged at the topmost part of a form cassette. finishing [this technique / applicant for this patent / a proposal] as JP,11-35192,A already — it is — in addition — and since the structure of the printer section itself does not participate in the invention in this application directly, the explanation is omitted.
[0013] Moreover, a memory card 300 is easy to be the general-purpose thing currently used with current and a digital camera.

Moreover, that by which hierarchy coding (JPEG etc.) was carried out as a graphics format memorized by the memory card is most, and since the thumbnail image is memorized, suppose that it is utilized also with this operation gestalt.

[0014] Drawing 3 is picturized with the digital camera memorized in the memory card 300, and shows the storing situation of each memorized image. In practice, generally, although it is not so simple as illustration, since each file consists of "figures of about five characters by which renewal of sequential is carried out whenever the alphabet + storage (photography) of three characters is done", this operation gestalt expresses a file name by AAAnnnnn for convenience (as for "AAA", the figure of 0 thru/or 9 is arranged by immobilization, as for each beam of "nnnnn"). Moreover, since it is possible to delete the image photoed in the digital camera and to repeat storage, the sequence of a file name is not necessarily the same as the order of storing in a memory card 300 like illustration. However, if it sorts by the file name, it will become possible to consider as the order of photography time.

[0015] Drawing 4 shows the example of arrangement of various keys prepared in the control panel 103 in an operation gestalt. In illustration, 40 thru/or 43 are cursor keys, and it is used in order to choose one of the images displayed on the display screen of a monitor 200. 44 and 45 are screen switch keys, and the detail is mentioned later. 46 and 47 are scrolling keys. The image chosen just before the depression makes it print by the printer section 4, and 48 is ****, when it is a print key and the key is pressed. 49 changes the number of the images displayed on a monitor 200, and with the operation gestalt, whenever this key 49 was pressed, it was made to switch image display with the large size of one sheet, and the thumbnail image of 4x4. Moreover, when this key 49 is pushed on the midst as which the thumbnail image of 4x4 is displayed, the image of one sheet chosen at that time will indicate by the maximum in the whole display screen of a monitor 200.

[0016] When displaying the thumbnail image of 4x4 in an operation gestalt, each thumbnail image is displayed in the form of either of the frames 50 and 51 (these image patterns are stored in ROM2) shown in drawing 5 (a) and (b). An operator explains below the principle which discovers the target image in thumbnail image display mode to be the difference in the semantics of these displays.

[0017] Suppose that the image memorized by the memory card 300 with the digital camera is now memorized by 200 sheets. Although it was old technique to display as a unit 16 sheets which continue from the head of these, now, actuation concerning a screen switch of most 13 (**200/16) times must be performed to discover the target image.

[0018] With this operation gestalt, first, in order to sort in order of photography, a file is used as a key and sorted. However, if the file format of the memory card memorized with the digital camera is usually followed, since photography time information is included in the header of each file, it may be made into a key.

[0019] And it asks for the number of skips by dividing the number of the files memorized (it being also the number of images) by the number of thumbnails displayed at once. The image number of sheets according to this number of skips is managed as one group, and the thumbnail image of each group's representation image (an operation gestalt each group's head image) is displayed.

[0020] Since the number of skips is "12.5 (**200/16)" in the above-mentioned case, the 12-sheet unit of the sequence is made into one group to the sorted image, and the thumbnail image corresponding to each group's head image is displayed by developing from a memory card to read-out and video memory 6.

[0021] When a number shows the sequence of the thumbnail of the sorted file, as shown in drawing 6 (a), 1, 14, 27, and a —189 position thumbnail image will be displayed (the number of illustration is a thing on expedient).

[0022] In addition, in the displayed thumbnail of 16 sheets of illustration, in fact, if it carries out the integer arithmetic of 200/16, the number of skips must be an integer and the difference of the number of 8 thumbnails of the first half will have become "13", because it is set not much to "8" (= 200−16x12). The result of having assigned this remainder to division into equal parts from the thumbnail of the first half is in the condition of illustration. Therefore, in illustration, the difference of the number of eight sheets of the second half under display is set to "12."

[0023] Moreover, the thumbnail image of an upper left corner was chosen in the initial state (although mentioned later, it is also the case where a key 45 is operated). It enabled it to discriminate the selected thumbnail image from the thumbnail image in other conditions of not choosing, by carrying out highlighting of the frame. Of course, if it is a discriminable gestalt, since a mark may be displayed or the color of a frame may be changed, it will not necessarily be restricted to the gestalt of illustration.

[0024] Now, if the thumbnail image made into the purpose in the state of this drawing (a) is displayed, an operator moves cursor (highlights location) to the location by operating a key 40 thru/or 43, changes into a selection condition, and should just operate a key 48. This prints a selection image by the printer section 4.

[0025] Moreover, also when the target image is not found, naturally it may be during a thumbnail image list of this drawing (a). With an operation gestalt, as for between which thumbnail images since it is displayed in order of photography at least, the thumbnail by which it was indicated by the list has the target image, if the relation of two continuous thumbnail images is seen, guess is attached easily.

[0026] And in the case of this drawing (a), each thumbnail image is displayed with the frame 51 shown in drawing 5 (b). That is, since it is displaying with the gestalt as if it was displaying the head of the image of two or more **, it makes it possible to consider as a still more intuitive thing.

[0027] What is necessary is here, to change the 14th thumbnail into a selection condition using a key 40 thru/or 43, and just to carry out the depression of the key 44, when aim that the target image is between the 14th thumbnail of this drawing (a) and the 27th thumbnail image is attached.

[0028] Consequently, a list [like this drawing (b) which makes the 14th thumbnail image a head] whose display screen of a monitor 200 is is displayed (since the last three did not exist, they displayed the predetermined mark like illustration). The target image can be discovered here, and if the directions to print are performed by the same actuation as the above, the selection image will be printed. Moreover, in this drawing (b), each thumbnail image is displayed with the gestalt which used the frame of drawing 5 (a).

[0029] In addition, when the number of images memorized by the memory card 300 is less than 32 sheets, the case where the number of skips between the thumbnail images of some of drawing 6 (a) is set to "1" occurs. In this case, that thumbnail image chooses, and even if it presses a key 44, in order to tell it not to mention the thumbnail image in the layer under it being made not to be displayed, the gestalt of that thumbnail image is displayed by the frame 51 of drawing 5 (a).

[0030] Moreover, when the depression of the key 45 is carried out in the state of drawing 6 (b), a screen will return to an initial screen (this drawing (a)).

[0031] In case an early thumbnail image list is displayed like the above, grouping of the number of the images memorized by the memory card is carried out with the number of skips which divided by the number of thumbnail images in which a list display is possible, and was obtained, and it becomes possible to offer the environment where the target image is made to arrive easily to a user, by displaying the thumbnail of each group's representation image.

[0032] In addition, naturally the computed number of skips may sometimes become larger than the number of thumbnails which can be displayed at once. In this case, what is necessary is just made to perform screen switch, scrolling, etc.

[0033] For example, if the above-mentioned example is followed when the image of 400 sheets is memorized by the memory card 300, the number of skips will be set to "25" and displayed on an early thumbnail image list will become the 1st after a sort, the 26th, the 51st, —, the 476th thumbnail image of 16 sheets. What is necessary is to display 26 thru/or the 41st thumbnail image of 16 sheets on the display screen first, when it carries out also here, the 26th thumbnail image is chosen and a key 44 is pressed, and just to display 42 remaining thru/or the 50th remaining thumbnail image, when the following page key 46 is operated. If the front page key 47 carries out the reverse actuation and a key 45 is operated, it will return to the screen of drawing 6 (a).

[0034] What is necessary will be just to process CPU1 in the printing equipment 100 of an operation gestalt in the procedure shown in drawing 7 . In addition, the program concerning this drawing is stored in ROM2.

[0035] First, if powering on is made, it will judge whether memory card I/F is equipped with the memory card at step S1. In the case of no, the message which progresses to step S2 and stimulates insertion of a memory card is displayed, and it returns to step S1.

[0036] Moreover, when wearing of a memory card is detected, the value which divided the number of the images memorized by the memory card by the number of the thumbnail images to Variable N which substitute and display the value of Variable N on a screen is computed as the number S of skips (step S3, S4). And the file name of the image memorized by the memory card at step S5 is used as a key, sorting application is performed, and the skip display of a thumbnail image which was previously explained at step S6 is performed.

[0037] Subsequently, it progresses to step S7 and a variable F= 0 is substituted. This variable F is for identifying the condition that a display condition displays the thumbnail group which continues from the thumbnail which a skip indication of the skip display condition of drawing 6 (a) and this drawing (b) was given, and was chosen.

[0038] In this way, if a skip display is completed, processing will progress to step S8 and will become the input waiting from a control panel 103.

[0039] When a key 40 thru/or 43 are operated, processing which moves cursor in the direction of the key operated by progressing to step S9 is performed, and it returns to step S8.

[0040] Moreover, when a key 44 is operated, it progresses to step S10 and judges whether Variable F is "0." In the case of "0", since a display condition is in the skip display condition shown in drawing 6 (a), it progresses to step S11 and displays the continuous thumbnail located in the layer under it like drawing 6 (b) including the thumbnail chosen at the time. And "1" is substituted for Variable F and it returns to step S8.

[0041] Moreover, when a key 45 is operated, it progresses to step S13 and judges whether Variable F is "1." When it is judged that it is "1", since the display gestalt at that time means that it is in the condition of drawing 6 (b), it progresses to step S14, performs the same skip display processing as previous step S6, and, subsequently to "0", carries out Variable F at step S15.

[0042] Moreover, since these keys function only in the state of drawing 6 (b) when it is judged that keys 46 and 47 were operated, it judges whether Variable F is "1" and scrolls only at the time of "1" (step S17). (switch of a screen) In addition, as for these keys, in below the number of thumbnails which the number of skips can display, naturally, semantics is not made like drawing 6 (b).

[0043] When a key 48 is operated, printing by the printer section 4 is performed based on the non-reducing image corresponding to the thumbnail image chosen at the time.

[0044] If this operation gestalt is followed as explained above, it will become possible to discover the image for printing efficiently easy moreover out of the memory card photoed and memorized with the digital camera.

[0045] In addition, although the printer equipment which has the function which equips with a memory card and carries out a monitor output was made into the example and the operation gestalt explained it, the above skip displays may be made to apply to the liquid crystal display which a current digital camera has, for example, and the object to search is not limited to a printout.

[0046] Moreover, although the above-mentioned operation gestalt explained the number of the images of the thumbnail displayed on a monitor as 16 sheets, the invention in this application is not necessarily limited by this number, and, of course, a user may enable it to set up suitably, of course.

[0047] It was the example which displays the thumbnail list which follows in time from that selected thumbnail image in the case where performed the skip display about the initial screen (henceforth, primary screen), chose one of the thumbnail images skip on display with the <operation gestalt of ** 2nd> above-mentioned implementation gestalt, and a predetermined key is operated (this screen condition is hereafter called secondary screen).

[0048] However, if the storage capacity of a memory card becomes large and the number of sheets of the image memorized increases more, possibility that a scrolling activity [in a secondary screen] is needed will become high (if 256 sheets are exceeded correctly).

[0049] So, with the operation gestalt of **** 2, it is made to perform skip display processing also in this secondary screen. That is, in case a secondary screen is displayed, the same grouping processing as a primary screen is performed (secondary grouping), and the thumbnail corresponding to each group's representation image is displayed. thus — if it carries out — the place of a join office — 16x16x — a scrolling activity becomes unnecessary to the number of images for 16= 4096 sheets, and it is efficient.

[0050] For example, when the image of 400 sheets is memorized by the memory card, at an initial screen, a thumbnail image list display is performed with the number of skips "25 (= 400/16)." And one of them is chosen, and when there are display directions of the image located in the layer under it, since it is set not much to 9, about the thumbnail image of nine sheets of the first half, it expresses as the frame of drawing 5 (b), and expresses as 25 / 16= 1, and a frame like drawing 5 (a) about seven sheets of the second half. When any one of the nine sheets of the first half is chosen and there are display directions of a lower layer thumbnail image, that thumbnail image (in this case, two sheets) is expressed as the frame of drawing 5 (a).

[0051] As explained above, according to the operation gestalt of **** 2, it becomes possible to make simpler actuation which discovers the target image.

[0052] In addition, although the above-mentioned operation gestalt explained the example in which the information which hierarchy coding is carried out as a storage format of a memory card, and is utilized as a thumbnail image is stored, since you may make it create a thumbnail image by the side to reproduce, this invention is not limited by the above-mentioned operation gestalt.

[0053]

[Effect of the Invention] As explained above, according to this invention, it becomes possible to discover the image made into the purpose out of the storage memorized by image pick-up equipments, such as a digital camera, by simple actuation.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the appearance perspective view showing the busy condition of the printer equipment in an operation gestalt.
[Drawing 2] It is the internal-block block diagram of the printer equipment in an operation gestalt.
[Drawing 3] It is drawing showing an example of the storing situation of the file in the memory card in an operation gestalt.
[Drawing 4] It is drawing showing the control panel of the printer equipment in an operation gestalt.
[Drawing 5] It is drawing showing the class of frame for thumbnail image display in an operation gestalt.
[Drawing 6] It is drawing for explaining the display of the thumbnail image in an operation gestalt.
[Drawing 7] It is the flow chart which shows processing of the printer equipment of an operation gestalt of operation.

[Translation done.]

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DRAWINGS

[Drawing 1]

ビデオ出力ケーブル

[Drawing 2]

メモリカード

5	メモリカードI/F	CPU — 1
103	操作パネル	ROM — 2
		RAM — 3
8	ビデオメモリ	プリンタ部 — 4
7	ビデオ出力部	

モニタ

[Drawing 3]

300

AAA00015
AAA00020
AAA00032
AAA00017
⋮
AAA00500

[Drawing 4]

	40			44	46	48
42		43		ロ→▦	次頁	プリント
	41			▦→ロ	前反	拡大／縮小
				45	47	49

[Drawing 5]

(a)　　　　(b)

50　　　51

[Drawing 6]

N = 200

(a)

1	14	27	40
53	66	79	92
105	117	129	141
153	165	177	189

(b)
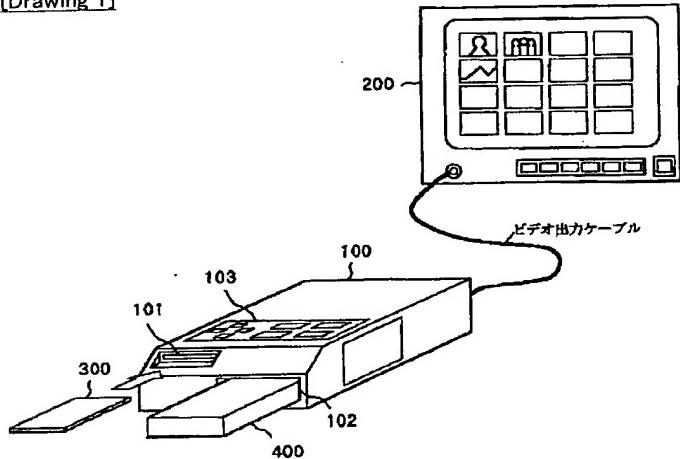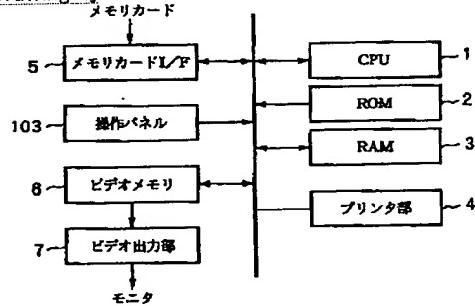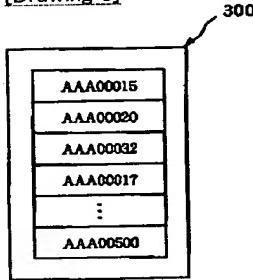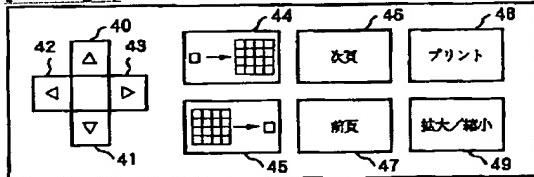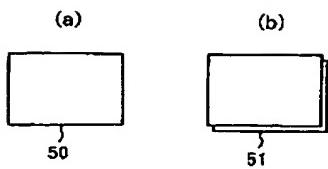
14	15	16	17
18	19	20	21
22	23	24	25
26	--	--	--
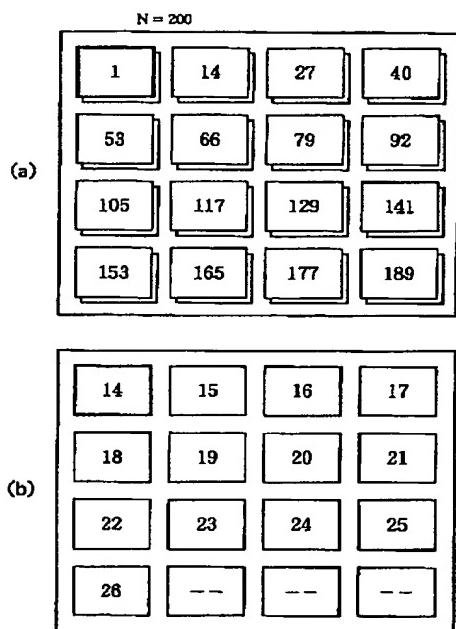
[Drawing 7]

[Translation done.]